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(54) Title: PRECIOUS METAL OXIDE CATALYST FOR WATER ELECTROLYSIS

(57) Abstract: The invention is directed to iridium oxide based catalysts for use as anode catalysts in PEM water electrolysis. The claimed composite catalyst materials comprise iridium oxide (IrO₂) and optionally ruthenium oxide (RuO₂) in combination with a high surface area inorganic oxide (for example TiO₂, Al₂O₃, ZrO₂ and mixtures thereof). The inorganic oxide has a BET surface area in the range of 50 to 400 m²/g, a water solubility of lower than 0,15 g/l and is present in a quantity of less than 20 wt.% based on the total weight of the catalyst. The claimed catalyst materials are characterised by a low oxygen overvoltage and long lifetime in water electrolysis. The catalysts are used in electrodes, catalyst-coated membranes and membrane-electrode-assemblies for PEM electrolyzers as well as in regenerative fuel cells (RFC), sensors, and other electrochemical devices.